

FFAG Injection for eRHIC

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Principle

- FFAGs use reverse bends for Dispersion matching.
 - “dog leg” has matched dispersion, but zero deflection
 - Add focussing using combined function magnets
 - Two steps forward, one step back
- Maximum dispersion inverse proportional to number of cells
 - Use eRHIC tunnel for FFAG
 - 360 cells = 1080 m ~ 1/3 RHIC
- Use two insertions
 - Four 2.2 m drift spaces
 - 4 super-conducting cavities 50 MeV/turn, no spin resonances
 - Injection/Ejection kickers
 - Dispersion matched using dipoles.

Two FFAGs for eRHIC

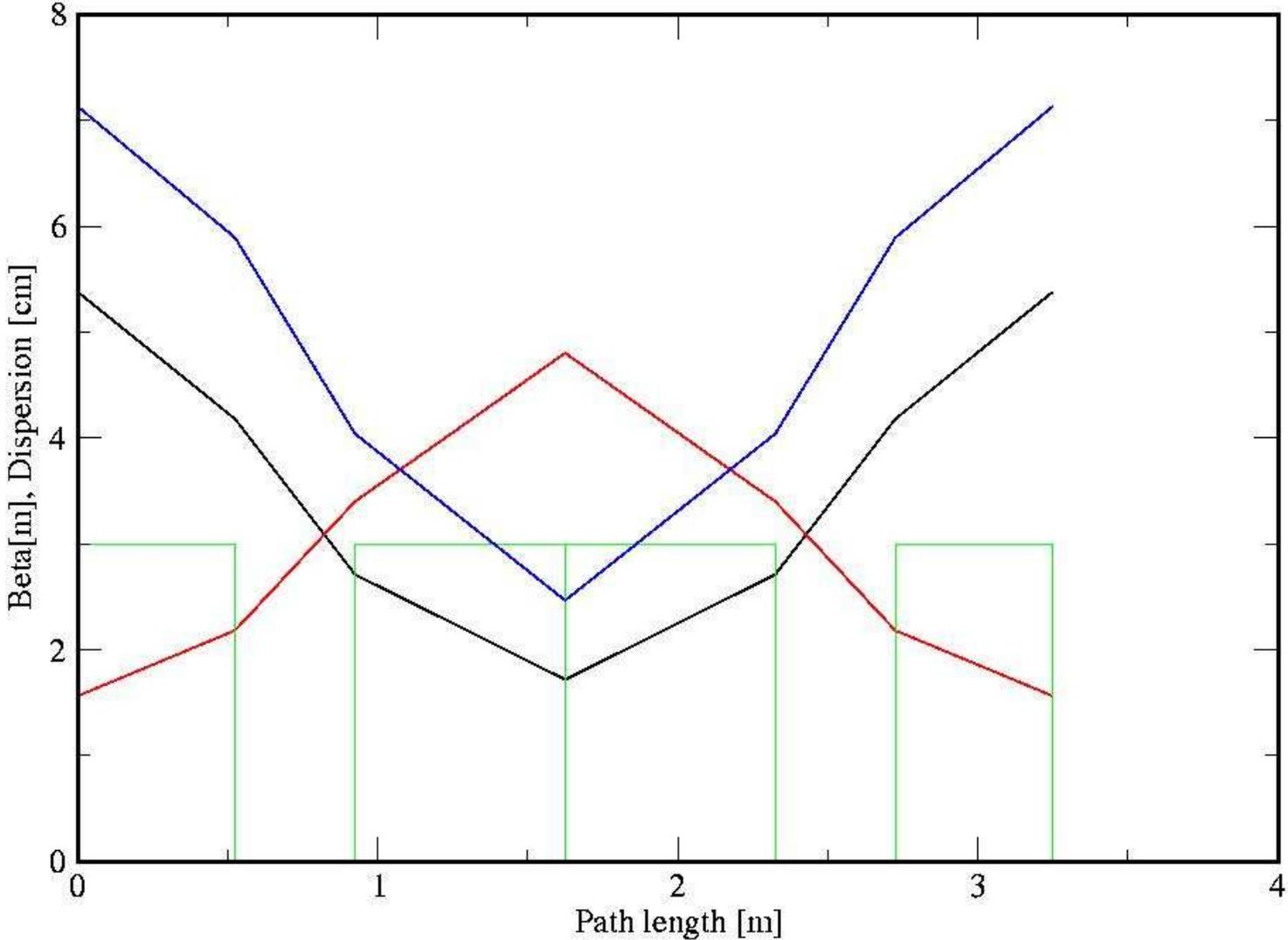
- 5 GeV nominal energy (2.5->10 GeV)
- 1.25 GeV nominal energy (0.65->2.5 GeV)
- 650 MeV linac

Costs

- 750 MeV Linac (650 MeV + 2*50 MeV)
- Magnets 15 M\$
- Vacuum, instrumentation 5 M\$
- Kickers
- Detector By-Pass tunnel

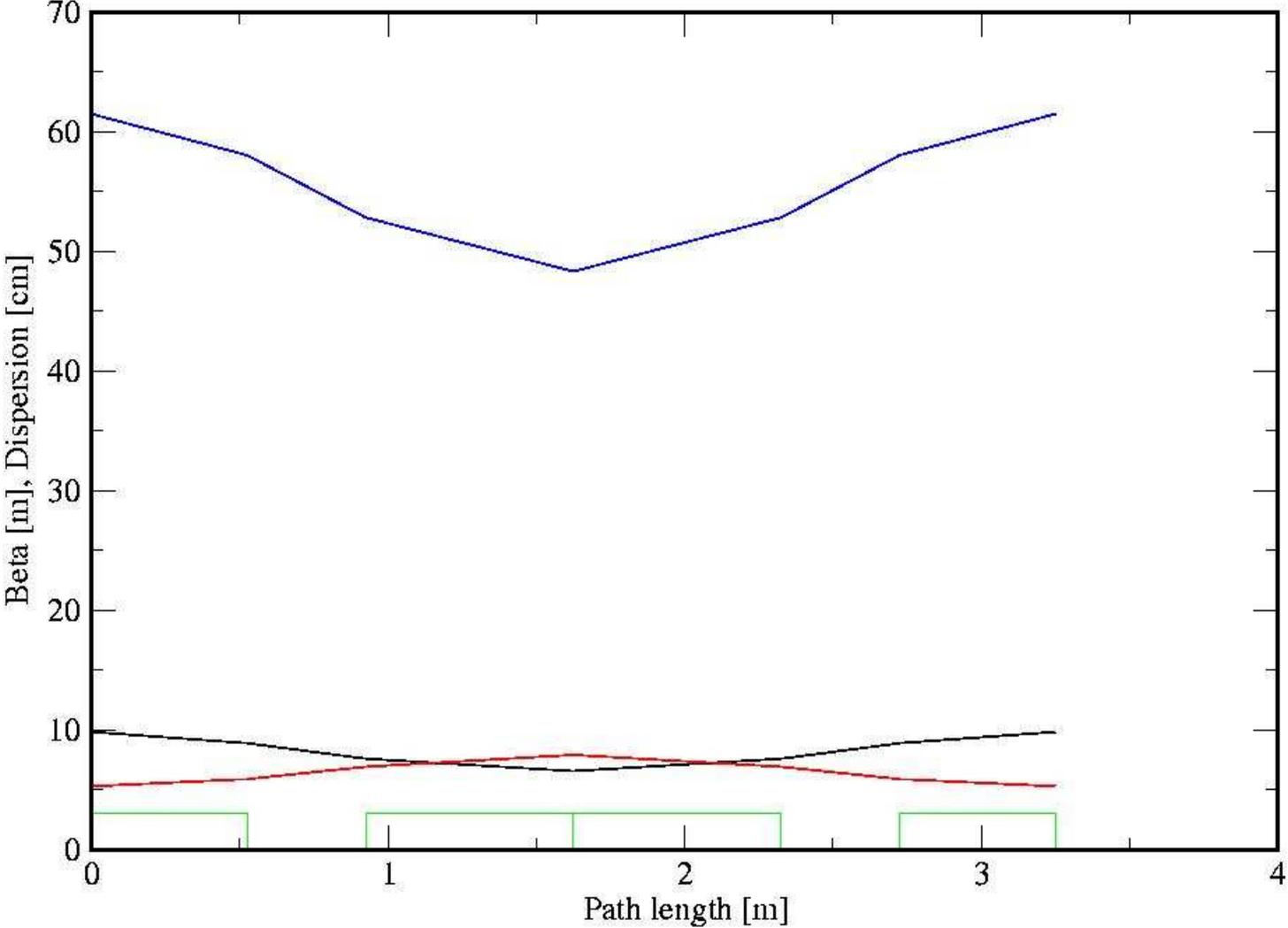
FFAG Cell

$dp/p=0$



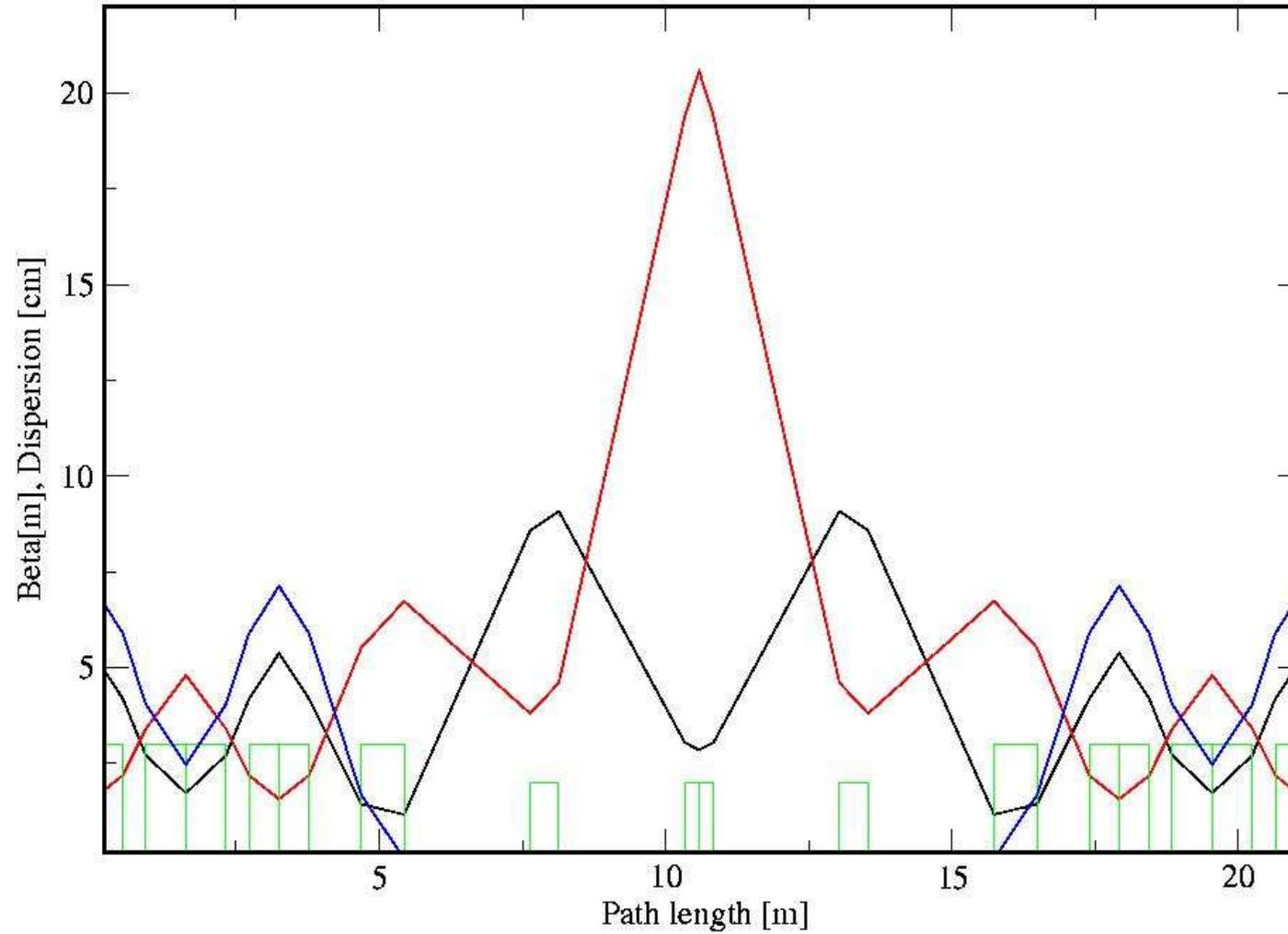
FFAG Cell

$dp/p = 150\%$



FFAG Insertion

$dp/p=0$, drift length = 2.2 m



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